Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Unlicensed Operation in the TV Broadcast Bands	)	ET Docket No. 04-186
	)	
Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band	)	ET Docket No. 02-380
	)	
	)	

TO: The Commission

REQUEST FOR CLARIFICATION OF
THE ASSOCIATION FOR MAXIMUM SERVICE TELEVISION

The Association for Maximum Service Television, Inc. (MSTV) respectfully requests that the Commission clarify certain aspects of its proposal to allow unlicensed devices to operate in the broadcast television spectrum at locations where the spectrum is "unused" by television stations.[1] Such clarification will allow MSTV and other parties to produce a full and responsive assessment of issues raised by that proposal.

I. REASON FOR AND PREMISES OF MSTV'S STUDIES.

An oft-repeated premise of the Commission's proposal is that unlicensed devices will cause no interference to the public's television service.[2] At the same time, substantial concern and uncertainty have been raised about the theoretical and practical validity of that premise, both during the digital television transition and afterwards. A

[1] *Unlicensed Operation in the TV Broadcast Bands*, Notice of Proposed Rulemaking, ET Docket No. 04-186, FCC 04-113 (rel. May 25, 2004) (hereinafter "*NPRM*").

[2] *Id*. at ¶ 15 ("[I]t appears that there are technical options now available that make it feasible for new types of unlicensed equipment to share spectrum in the TV bands without causing harmful interference to TV broadcast or other licensed services operating within these bands."); *OET Chief Sees Potential Solution For "White Spaces" TV Proposal*, Communications Daily, April 19, 2004 (Quoting Office of Engineering & Technology Chief Edmond Thomas as stating that the unlicensed devices proposal is "design[ed]… in such a way [that] it doesn't create interference for the TV broadcasters in the channels that are used.").

productive discussion concerning the Commission's unlicensed devices proposal will depend on a full and reliable evaluation of that underlying premise. Accordingly, MSTV, alone or with other interested organizations, is proceeding with a comprehensive measurement and evaluation program to assess the impact of the Commission's proposal on the public's current television service and the digital transition. Specifically, it intends to conduct:

- A laboratory evaluation of the interference potential of unlicensed devices on existing analog and DTV receivers;
- An assessment of the available spectrum for unlicensed devices; and
- Other tests that are deemed appropriate to develop a technically sound and complete record in this proceeding, such as an evaluation of the feasibility and practicality of unlicensed equipment that would provide the interference protection necessary to safeguard the integrity of the broadcast television service.

The Commission's Notice of Proposed Rulemaking, however, fails to provide certain important technical information necessary for such an evaluation.[3] These uncertainties make it both difficult and risky for MSTV (or any other party) to undertake its planned tests. Although, in the interest of time, MSTV is willing to begin its studies and assume the risk that its preliminary findings may rest on an incomplete understanding of the NPRM's parameters, it also requests that, as soon as possible, the Commission provide clarification on the issues described below.

II. TECHNICAL ISSUES ON WHICH MSTV REQUESTS CLARIFICATION.

Following is a description of technical matters raised in the Commission's NPRM for which MSTV respectfully requests additional clarification. MSTV has separately identified and described each factor to facilitate the Commission's ability to respond to this

[3] When it files comments in this proceeding, MSTV may raise questions about the Commission's suggestions for the parameters of unlicensed operation in the broadcast television spectrum. At this time and for the purposes of its comprehensive studies, however, MSTV simply wishes to understand the parameters of the Commission's proposal.

request, but the factors are dependent with one another. As a consequence, an error in one factor may affect conclusions that are dependent not only on that factor, but some or all of the others as well.

A. Minimum/Maximum Operating Bandwidth and Channelization.

The Commission's NPRM does not specify the minimum/maximum operating bandwidth or channelization for the proposed unlicensed devices. For example, it is unclear whether the unlicensed devices would operate with a fixed channelization bandwidth similar to Wi-Fi devices currently operating under the IEEE 802.11 standards, or a scalable channelization bandwidth similar to IEEE 802.16 devices. It is also necessary to know whether these devices will operate using all six MHz of a "vacant" adjacent television channel, or only a sliver of megabits in the middle of each channel. Moreover, the Commission should clarify whether the fixed/access devices (*i.e.*, fixed base stations) operate as stand-alone devices, or a wireless network (such as in a WiMAN system), or both. Perhaps the answer to these questions will vary depending on which type of service is to be rendered by the unlicensed device?

Knowledge of the service types and operating bandwidth of the unlicensed devices is necessary not only to determine their interference impact on television receivers, but also to assess the related technical complexity and economic viability of devices that would adequately protect television reception from out-of-band emissions. Accordingly, MSTV seeks clarification on these issues and requests that the Commission clearly specify the operating bandwidth and the maximum-allowed out-of-band emission (*i.e.*, how many dB down relative to their defined-peak power) for the fixed-base transmitters when they operate on a single 6 MHz channel within the television spectrum bands. Lacking such information, MSTV will assume a single architecture (mesh network) in its tests of unlicensed device

operation in the television broadcast spectrum. But if this assumption is mistaken, MSTV's test results may not accurately reflect the actual interference risk posed by the unlicensed devices.

B. Operation Within a Single or Multiple Channels.

The NPRM proposes that fixed-base station devices be capable of operating on multiple channels. It also, however, proposes to use D/U ratios that were developed for a single six-MHz wide (*i.e.*, broadcast-based) television channel in determining the appropriate location of the fixed-base station devices.[4] Thus, for a given fixed location within a television service area, MSTV is uncertain whether 1) these devices will operate on multiple channels, with a requirement that they meet the D/U ratios for all the television stations in the vicinity of that location, or 2) they will operate on a single television channel, with a requirement only that they comply with the co-channel and adjacent channels D/U ratios for that single channel.

Clarification regarding the scope of unlicensed device operation across single or multiple channels is necessary to determine the availability, if any, of white areas in congested markets, and/or the restrictions necessary for these devices to operate in such markets. Lacking clarification from the Commission, MSTV will assume that these fixed devices will operate on multiple channels and will be placed in locations where they have to meet all the required D/U ratios. If this assumption is mistaken, MSTV's test results may incorrectly identify where fixed-base station devices could be located in a given market, as well as the resulting interference from operation in those locations.

[4] *NPRM* at ¶ 30.

C. Modulation Type.

The NPRM does not specify the type of modulation allowed for the unlicensed devices. This factor may impact the performance and manifestation of interference on both an analog and/or digital television receiver.[5] For example, depending on the modulation-type used, interference from a device may appear as noise-like interference on a television set, a band across the television screen, or a total elimination of the television picture and/or sound.

Specifying the modulation type would allow MSTV and other interested parties to properly test and assess the potential interference impact of unlicensed devices on the current population of television receivers. In addition to measuring interference potential, such information is essential for conducting MSTV's spectrum availability evaluation. Without specification by the Commission regarding modulation type, MSTV will have to assume a single modulation-type that, in its good faith judgment, best approximates the likely character of the unlicensed devices that would operate in the television spectrum. Using a single-modulation type would limit MSTV's findings to the chosen modulation scheme and may not necessarily be appropriate to the actual modulation-type eventually used by the unlicensed devices.

D. Desired Signal Level.

In its NPRM, the Commission proposes to apply the FCC Broadcast Curves to determine the separation distances necessary to protect television receivers from interference caused by unlicensed devices operating on a co-channel or first adjacent channel(s) of a

[5] For example, the potential for interference to digital television receivers may vary depending on the spread spectrum technique, such as direct sequence or frequency hopping, used by the unlicensed devices.

television station.[6] Yet the Commission specifies the F(90,90) curves, which are not defined under its rules, to determine the Desired signal level (D) of unlicensed device operation inside a TV station adjacent channel contour. It is thus unclear what dB correction should be used to adjust the FCC's F(50,50) or F(50,90) curves in order to calculate the desired F(90,90) field strength level. MSTV also requests clarification on whether that correction varies depending on the Antenna Height Above Average Terrain value.

Without a correction factor for the F(90,90) criteria, it is not possible to identify the required distance separation needed to protect television service from unlicensed device interference, or the availability of white areas within a TV station adjacent channel contour. Lacking guidance from the Commission, MSTV's analysis will use a correction factor of 7.1 dB to be added to the field of the FCC(50,90) curves for VHF and UHF.[7] If this assumption is incorrect, MSTV's analysis may severely under- or overestimate the appropriate interference protection area inside an adjacent channel TV contour.

E. Undesired Signal Level.

The NPRM also proposes use of the broadcast F(50,50) curves, but specifically the appropriate power of the unlicensed device and actual antenna height above ground, to compute the undesired signal level (U) generated from the unlicensed devices.[8] But the FCC (50,50) curves do not specify antenna height above ground, but rather Antenna Height Above Average Terrain (HAAT). MSTV thus asks the Commission to clarify whether it proposes to substitute the antenna height above ground for HAAT for purposes of computing interference from fixed-base unlicensed devices.

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[6] *NPRM* at ¶ 30. The Broadcast Curves are found in Section 73.684 of the Commission's rules.

[7] The 7.1 dB correction factor is currently being used by the Canadian government to compute coverage of DTV stations.

[8] The portable/personal devices are assumed to have a maximum antenna height of 2 meters. Fixed base-station devices are assumed to have a minimum antenna height above ground of 10 meters. *NPRM* at ¶ 31.

The requested information is essential for conducting a reliable spectrum availability evaluation. Absent clarification from the Commission, MSTV will use the Antenna Height Above Average Terrain figure to compute the undesired field strength level. Using the wrong criteria could result in seriously under- or overestimating the interference constraints necessary to protect the public's television service.

F. Other Appropriate Models.

The Commission also proposes to allow manufacturers and distributors of unlicensed devices to calculate the undesired unlicensed signal levels using "other appropriate models" besides the broadcast F(50,50) curves.[9] In evaluating these proposals, it is impossible to assess interference risks without knowing the parameters for these other unspecified models.

Specification of these alternative models by the Commission is necessary for the television industry to conduct a thorough evaluation of the unlicensed device proposal, and will eliminate confusion among the various commenters about which model parties have used in reaching their conclusions about the Commission's proposal.[10] Clarification on this point is therefore essential to MSTV's spectrum availability analysis. Lacking guidance from the Commission, MSTV will use only the FCC Broadcast Curves to conduct its analysis. As a result, its findings will not necessarily be applicable to the many potential unspecified models of determining undesired signal levels for unlicensed devices.

[9] *Id.*

[10] Moreover, because these devices are unlicensed, the Commission will not be in a position to evaluate the unspecified appropriate models before they will be used in the field.

CONCLUSION

MSTV seeks to undertake an objective, good faith analysis of the Commission's proposal to allow unlicensed device operation in the television broadcast spectrum. In light of the impact that the accuracy of MSTV's assumptions will have on its comprehensive analysis, MSTV respectfully requests prompt clarification on the points described above.

Respectfully submitted,

/s/ David Donovan

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